The NGST Science Instrument Procurement Plan

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NEXT GENERATION

NGST

SPACE TELESCOPE

The NGST will carry approximately 3 science instruments (SI) that together enable the wide field imaging and spectroscopic capability needed to perform the Design Reference Mission (http://www.ngst.nasa.gov/science/drm.html). The NGST telescope will permit these instruments to achieve Zodical light limited sensitivity over a wavelength range of 0.6 – 10 microns.

During April 2000, responsibility to provide these instruments will be allocated among the NGST partner agencies: NASA, ESA, and CSA. Instruments allocated to NASA will be solicited via a NASA Announcement of Opportunity (AO) during June 2001. This AO will be open to university, government, and industry scientists.

At the present time, 11 pre-Phase A one-year SI concept studies are being conducted by NASA, ESA, and CSA funded community teams. Final results from these studies will be presented at the NGST Science and Technology Exposition at Woods Hole MA during September 1999 (http://ngst.gsfc.nasa.gov/science/ meetings/WHannouncement.html). It is not necessary to have participated in these pre-Phase A activities in order to answer the up coming flight instrument AO.

In this poster, we present the process by which SI concepts will be allocated among NASA, ESA, and CSA prior to the AO solicitation as well as top level time lines for instrument acquisition and development.

SI Procurement and Allocation

Science Instrument (SI) Procurement Rationale

GOALS

- Science and instrument team selection via NASA AO process at mid-formulation phase (2/02)
- Close SI concept trade early in phase A to:
  - Enable smart customer instrument allocation among NASA, ESA, and CSA
  - Enable architecture level system trades to proceed
  - Focus ISIM technology development spending to retire risk early

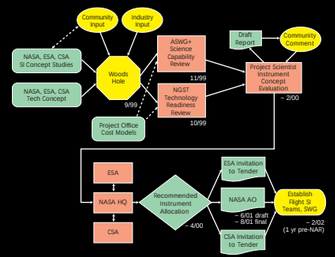
PROCESS

- Process reviewed by: ASWG, SRB, NESR, HQ, Origins Subcommittee
- Prioritization of generic instrument concepts/ capabilities
  - Science capability: Ad Hoc Science Working Group (ASWG)
  - Technical feasibility and cost: NGST Project team review
  - Recommendation issued by Project Scientist
    - Draft open for public comment (1/00)

RESULT

- Generic SI concepts evaluated prior to inter-agency allocation AO solicitation
- Wide field of offerors -- participation in pre-phase A not required

Science Instrument Procurement Process



Pre-AO Concept Evaluation Process

Ad Hoc Science Working Group

- Select generic concepts/capabilities for instruments that enable the NGST Phase A science requirements and DRM.
  - wide field imaging and spectroscopy over 0.6 - 10+ microns
  - diffraction limited angular resolution at 2 microns
  - Zodiacal background limited sensitivity over 0.6 - 10+ microns

Technology Readiness

- Committee of engineers and scientists convened by NGST Project Scientist
- Assess generic concepts for technical feasibility and readiness relative to NGST development schedule

Project Scientist

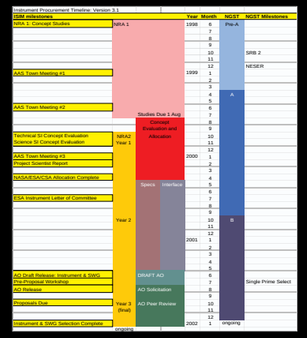
- Consolidate ASWG and Technology Readiness Review findings into report
  - Draft available for public comment

Inter-Agency Negotiation

- Recommended NASA/ESA/CSA instrument allocation

SI Acquisition and Development Timelines

Instrument Acquisition Timeline



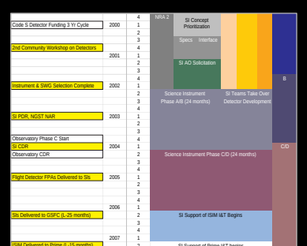
Instrument Procurement: Critical Path Milestones

1. **Concept Studies: 6/98 - 8/99 (currently in progress)**
   - US and European community concept studies: ongoing through 8/99.
   - GSFC baseline ISIM system design study: ongoing
   - ESA ISIM system design study: ongoing through 8/99.
2. **Concept Review: 9/99 – 4/00**
   - ASWG reports on scientific capability relative to DRM
   - NASA reports on technical and cost feasibility relative to NGST schedule
   - Project Scientist issues consolidated report
   - ESA and CSA SI roles identified
     - ESA and CSA instrument contributions may be excluded from NASA solicitation
   - HQ approves SI concept suite for US AO solicitation
3. **Flight Instrument Procurement: 6/01 – 2/02**
   - Flight instrument call for proposals draft release: 6/01
   - Pre-Proposal workshop: 7/01
   - Flight instrument call for proposals: 8/01
   - Flight instrument proposals due: 10/01
   - NASA and ESA flight instrument selection complete: 2/02

Instrument Procurement: Other Schedule Items

- Enabling Technologies and Modeling Studies: 9/99 – 9/02
  - NRA for community studies focusing on enabling technologies and performance modeling.
- Flight Science Working Group (SWG) solicitation coupled with NASA, ESA, and CSA instrument solicitations
  - Selects SWG scientists not affiliated with instrument teams
  - Flight SWG selection 2/02
    - Science leadership team in place ~ 1 year before Non Advocate Review

US Instrument Development Timeline



Community Concept Studies

US Community Instrument Concept Studies

Solicited from external community via NRA with NASA HQ peer review

Six teams, selected during Jun 98, 1 year performance period teams, selected during Jun 98, 1 year performance period

- J. Bechtold, T. Greene: U. of Arizona & Lockheed Martin Corp.
  - 0.3 - 40 micron imaging, spectroscopy, and ISIM layout
- J. Graham: U. of California & ITT Industries & Lawrence Livermore Labs
  - 1 - 15 micron Fourier transform imaging spectroscopy
- J. MacKenty: STScI/ Ball Aerospace/ GSFC
  - 1 - 5 micron multi-object spectroscopy with MEMS micro-mirrors
- H. Moseley: GSFC
  - MEMS micro-shutter aperture control for multi-object spectroscopy
- G. Serabyn: JPL
  - 5 - 28 micron camera/spectrometer and Sorption cryo-cooler
- J. Trauger: JPL
  - 5 - 30 micron high contrast coronagraph with deformable mirror

Proposal summaries available on NGST web site: http://ngst.gsfc.nasa.gov/

CSA NGST Science Instrument Studies

Three science instrument studies are underway in Canada

1. **Near-IR MOS/IFS:** David Crampton (HIA/DAO) + CAL (Ottawa)
2. **Visible Imager:** Paul Hickson (UBC) + CAL (Ottawa)
3. **IFIRS Imaging FTS:** Simon Morris (HIA/DAO) + Bomem (Quebec) (collaboration with US Graham/ITT study)

ESA Pre-Phase A Studies

- **Industrial Studies:**
  - Study of Multi-Object/Integral Field Spectrograph
  - Study of Payload Suite and Telescope
  - Study of Visible Wavelength Camera/Spectrograph
  - Study of the On-Board Data Management
- **Internal Studies:**
  - Studies of Spacecraft Support Module (SSM) Subsystems: Telecommunications, Power and Solar Array, Propulsion